

REMARKS

Claims 1-18 were pending in this application, of which claims 1, 4, 7, 10, 13 and 16 are independent. Independent claims 1, 4, 7, 10, 13 and 16 have been amended. Accordingly, claims 1-18 are still pending in this application and are believed to be in condition for allowance.

The Indefiniteness Rejection Under 35 U.S.C. § 112 Should be Withdrawn in Light of Applicants' Clarifying Amendment

Claims 1-18 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner alleges that there is insufficient antecedent basis for the limitation "the air" with respect to each of independent claims 1, 4, 7, 10, 13 and 16. Claims 1, 4, 7, 10, 13 and 16 have been amended to overcome this rejection by indicating that the method takes place "in a chamber" and by adding the term "outside said chamber" after "air". It is noted that this amendment corresponds with the Examiner's interpretation of the claims as indicated in the Office Action. Basis for the amendments can be found in the specification, specifically by looking at page 6, second paragraph, where it is noted that process 4 (the amorphous silicon film is crystallized by a heating process) may be performed continuously in the chamber without taking out the substrate. Further, the specification and Figures 1E and 5 describe the use of valves V1, V2, and V3 or valves V11, V12, and V13 to control exposure of the chamber to a first and second gas system 51 and 52, and an exhaust system 53.

Although this amendment is made in response to a rejection under § 112, the amendment should be considered merely clarifying in nature, and, thus, should not in any way affect the scope of protection afforded the claims for infringement purposes, particularly, under the Doctrine of Equivalents.

It is believed that "the air outside the chamber" is sufficiently definite with respect to § 112, and the rejection should be withdrawn.

The Present Invention is Not Obvious Under 35 U.S.C. § 103; Examiner has Failed to Make a Prima Facie Case of Obviousness

Claims 1-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al., U.S. Patent No. 5,147,826 (Liu). The Examiner has failed to make a *prima facie* case of obviousness; therefore, the objection should be withdrawn and the claims should be held allowable.

It should be noted that three criteria must be met to establish a *prima facie* case of obviousness. *M.P.E.P.* §2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings to achieve the claimed invention. *Id.* Second, there must be a reasonable expectation of success. *In re Rhinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). Third, the prior art must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

The Applicants respectfully contend that the Office Action has failed to set forth a *prima facie* case of obviousness since each cited reference, alone or in combination, fails to teach, disclose or reasonably suggest all of the limitations of the claimed invention. The Examiner alleges that Liu discloses a method of selectively crystallizing an amorphous silicon film deposited on an insulating substrate by using a thin film thermal deposition of palladium or nickel. The Examiner concedes that Liu does not teach all the claim limitations: "Liu et al. do not teach that the substrate under processing should not be exposed to air from the time the metal is deposited to the time the amorphous film is crystallized." Indeed, nothing in Liu raises the problem of exposure of the semiconductor device to air that could contaminate the device. Liu merely states that "The crystallization processes were done in either argon or oxygen atmospheres" (col. 5, lines 58-60).

The Examiner alleges that it would have been obvious that the substrate under processing should not be exposed to air from the time the metal is deposited to the time the amorphous film is crystallized, but the Examiner does not provide a single reference that would teach one with ordinary skill in the art at the time of the invention to modify Liu to achieve the claimed invention. Indeed, Applicants believe that it would not have been obvious to one with ordinary skill in the art at the time of the invention to modify Liu such that the chamber would avoid

exposure to air outside the chamber. Nothing in the prior art known to the Applicants or presented by the Examiner in the course of prosecution would suggest this sort of a modification. Applicants surmise that the Examiner could only have based the § 103 rejection on hindsight reasoning because no references are provided which prove the Examiner's contentions. Liu is improperly relied upon for the reasons set forth *supra*.

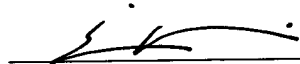
The Applicants further contend that even assuming, *arguendo*, that Liu is properly relied upon, there is a lack of suggestion as to why a skilled artisan would use the proposed modifications to achieve the unobvious advantages first recognized by the Applicants. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990).

Applicants respectfully request that the rejection under § 103 be withdrawn.

Conclusion

Prompt and favorable consideration is requested. In view of the above, all the claims in this case are believed to be in condition for allowance. Should the Examiner deem that any further action by the Applicant would be desirable in placing this application in even better condition for issue, he is requested to contact the undersigned.

Respectfully submitted,


Eric J. Robinson
Registration No. 38,285

NIXON PEABODY LLP
8180 Greensboro Drive, Suite 800
McLean, Virginia 22102
(703) 790-9110
(703) 883-0370 (FAX)

MARKED-UP VERSION OF
THE AMENDED CLAIMS

1. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with said semiconductor film in a chamber; and

crystallizing said semiconductor film in contact with said crystallization promoting material in said chamber,

wherein the step of crystallizing said semiconductor film is carried out successively after the formation of said crystallization promoting material without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.

4. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with said semiconductor film; and

crystallizing said semiconductor film by heating said semiconductor film;

wherein the step of forming the crystallization promoting material and the step of crystallizing said semiconductor film are conducted successively in a same [apparatus] chamber without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.

7. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with said semiconductor film by using a vapor of a gas containing said metal in a chamber; and

crystallizing said semiconductor film in contact with said crystallization promoting material in said chamber,

wherein the step of crystallizing said semiconductor film is carried out successively after the formation of said crystallization promoting material without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.

10. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with a selected portion of said semiconductor film in a chamber; and

crystallizing said semiconductor film in contact with said crystallization promoting material in said chamber,

wherein the step of crystallizing said semiconductor film is carried out successively after the formation of said crystallization promoting material without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.

13. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with a selected portion of said semiconductor film; and

crystallizing said semiconductor film by heating said semiconductor film;

wherein the step of forming the crystallization promoting material and the step of crystallizing said semiconductor film are conducted successively in a same [apparatus] chamber without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.

16. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a crystallization promoting material comprising a metal in contact with a selected portion of said semiconductor film by using a vapor of a gas containing said metal in a chamber; and

crystallizing said semiconductor film in contact with said crystallization promoting material in said chamber,

wherein the step of crystallizing said semiconductor film is carried out successively after the formation of said crystallization promoting material without exposing said semiconductor film and said crystallization promoting material to the air outside said chamber.